AUTOMATIC LIGHTING SYSTEM (ALS) FOR TAMAN TAS ECO SHOP BY USING ARDUINO UNO

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer Science & Networking).

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRACT

Nowadays, many sophisticated devices have been implemented in our lives in many kinds of places for a living. The importance of this kind of devices is to ease human daily life activities and improve the performance of products. Not being left behind, a technology for automatic lighting switching system is created and has been used in building likes home especially. It is used to control and monitor devices and hardware in house to deliver some functions. However, this kind of system for ECO Shop store is unusual found yet. A project named as Automatic Lighting System (ALS) is designed for Taman Tas ECO Shop store branch that selling daily things at price RM2.10 for each. Currently, Taman Tas ECO Shop branch is using manual lamp switching control which is the management assigns Supervisor Assistant only as person-in-charge to turn on or off the lamps every day. However, this store only has two person-in-charge so both of them cannot leave the store at the same time even in any situation. Therefore, it will be problem if that person-in-charge comes late before operating hours so the other workers cannot do their job earlier than operating hours. Besides that, extra electricity consumption also can happen if person-in-charge forgot to switch off lamps after operating hours. So, Taman Tas ECO Shop store branch need enhancement in controlling the lamps utilization before and after operating hours. By using ALS project, client can make the duty of lighting switching become easier and well-controlled. The project is divided into two main components which is a system that installed in computer to control Arduino Uno, and the second component is hardware includes Arduino Uno, sensor and other extra hardware. In conclusion, hope this project can bring benefits and fulfil client requirements.

ABSTRAK

Pada masa kini, banyak peranti canggih telah digunakan dalam kehidupan kita di pelbagai jenis tempat untuk kegunaan kehidupan seharian. Kepentingan jenis peranti ini adalah untuk memudahkan aktiviti kehidupan harian manusia dan meningkatkan prestasi produk. Tidak ketinggalan, satu teknologi iaitu sistem pensuisan lampu automatik dicipta dan telah digunakan di dalam bangunan terutamanya rumah. Ia digunakan untuk mengawal dan memantau peranti dan perkakasan di dalam rumah untuk melaksanakan beberapa fungsi. Walau bagaimanapun, jenis sistem seperti ini untuk kedai ECO Shop sukar ditemukan lagi. Projek yang dinamakan sebagai Sistem Lampu Automatik (ALS) direka untuk kedai ECO Shop cawangan Taman Tas yang menjual barang harian pada harga RM2.10 setiap satu. Pada masa ini, cawangan Taman Tas ECO Shop masih menggunakan kawalan pensuisan lampu secara manual dan pihak pengurusan memberi tugas kepada Penolong Penyelia sahaja sebagai orang yang bertanggungjawab untuk menghidupkan atau mematikan lampu setiap hari. Walau bagaimanapun, kedai ini hanya mempunyai dua orang Penolong Penyelia sahaja yang akan bertanggungjawab dan kedua-dua mereka tidak boleh meninggalkan kedai pada masa yang sama walau dalam apa jua keadaan. Oleh itu, ia akan menjadi masalah jika kedua-dua Penolong Penyelia datang lewat sebelum masa kedai beroperasi dan akan menyebabkan pekerja-pekerja lain tidak boleh melakukan kerja mereka lebih awal daripada waktu operasi. Selain itu, penggunaan elektrik berlebihan juga boleh berlaku jika Penolong Penyelia terlupa untuk mematikan suis lampu selepas waktu operasi. Jadi, kedai ECO Shop cawangan Taman Tas perlu peningkatan dalam mengawal penggunaan lampu sebelum dan selepas waktu kedai beroperasi. Dengan menggunakan projek ALS, pelanggan boleh melaksanakan tugas pensuisan lampu bertukar menjadi lebih mudah dan terkawal. Projek ini dibahagikan kepada dua komponen utama iaitu sistem yang dipasang dalam komputer untuk mengawal Arduino Uno, dan komponen yang kedua ialah perkakasan termasuk Arduino Uno, sensor dan perkakasan tambahan yang lain. Kesimpulannya, diharapkan projek ini boleh membawa manfaat serta memenuhi kehendak pelanggan.

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ALS	Autommatic Lighting System
SDLC	System Development Life Cycle

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

As technology development arise from time to time, many manuals of human daily routine and workplace has been transformed into automatic system controlled including in computer system, embedded system, or mobile applications. Most of the people can accept this kind of revolution because that inventions are intelligent. It can work for human efficiently similar as people do or even more than that. That is why this kind of technology implementation can be seen everywhere around us.

Here are a few examples of automation application in technologies that make life gets easier such as Smart thermostats, Smart Refrigerator, Ralph Lauren Polotech Shirt, and even more. Some of the automation technologies are controlled by using smartphone and some are not. These technologies also will be enhanced it functionality from time to time according to the current requirements of human needs.

Home automation tends about the automatic and electronic control of house properties, activity, and appliances. Certain components of an automated home including the control of security locks on doors and gates, windows, lighting, surveillance cameras and HVAC systems (heating, ventilation and air conditioning). However, the same concept of control the lighting likes home automation known as automatic lighting system for shop is not implemented yet for Taman Tas ECO Shop. Therefore, this project proposed to implement an Automatic Lighting System (ALS) for ECO Shop by using Arduino Uno. ECO Shop is a store that have very encouraging responses from customers because it sells any everyday products at RM2.10 only. It also has many branches in Malaysia either single or double storey store and operate at

10am to 10pm every day. For this project, double storey ECO Shop at Taman Tas branch is selected to be one of the shop that suitable to implement this project system for their easy lighting control. The shop still uses old method of lighting switching every day. So, this kind of old method should be transformed into automatic lighting system to make switching handling for ECO Shop become easier and suitable with its business nature.

This project will apply the advancement of computing technology from manual light switching in the shop to automatic lamp controlled by using system with the support of Arduino Uno and PIR sensor. Arduino is a single-board microcontroller meant to make the application more accessible which are interactive objects and its surroundings. Then, PIR sensor is a device that detects motion. Utilization of Arduino Uno and PIR sensor help system to automate switch on or off the lamps based on motion of human in the place in certain situations. Automatic Lighting System (ALS) for ECO Shop by using Arduino Uno is proposed to solve the problems of ECO Shop from manual light switching into automatic light switching. So, ECO Shop will have easy control, safe and advanced lighting switching by using appropriate system and hardware.

1.2 PROBLEM STATEMENT

There are three problem statements that tends to the development of this project.

Firstly, for the time being the store is still using the manual switching for lamps which is person-in-charge (PIC) need to turn ON/OFF light manually. This is become not really good when there are two different locations of electrical wall switches in the shop which is located at store and in office area. Taman Tas ECO Shop branch is totally still does not apply any enhancement of technology of automatic light switching. Due to this situation, it tends to waste electric consumption for ECO when PIC forgot to switch off the lamps. That is why this automation lighting project can help Taman Tas ECO Shop branch do easy control switching and save electric consumption during close time especially if the worker forgot to turn off lights.

Secondly, there is only two Supervisor Assistant as person-in-charge to turn on and off the lamps every day in that ECO Shop branch. In any case, the two Supervisor Assistant or one of them must come to work every day because only them were given the responsibility and authority of light switching. Two of them must follow that rules and cannot excuse even have other matters. This situation will give difficulties for the two Supervisor Assistant if both of them suddenly they have urgent matter in that day. By using automation, the time to turn on and off has been set up in system so that Supervisor Assistant no need to worry about their absence if something personal urgent matter happen.

Third, the use of sensor in certain situations is needed. First situation is when ECO Shop should operate until 10pm, there is still have customers in the shop that are not finish buying things and still walking around. The workers also need to stay in the shop until all customers go out from the shop. So, here the PIR sensor in this project will play roles to detect the motion and relay will make lighting alive until the shop is totally closed and there is no motion in it. The second situation is when new stock arrived at three days which are Wednesday, Saturday, and Sunday, all workers must come earlier than usual they come at other day. The sensor will detect motion in the shop so it will give the output for lamps turn on automatically. This automatic lighting system that connecting with PIR sensor can help improved the functionality

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